Guam Fire Weather Operations Plan

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FIRE WEATHER ORGANIZATIONAL DIRECTORY

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INTRODUCTION

The National Weather Service's Fire Weather Program is designed to provide forecasts, warnings, and consultation services for the prevention, suppression, and management of forest and rangeland fires on Guam. Weather support is available throughout the year. This Operations Plan will cover services provided by the Guam Weather Forecast Office.

This plan will be reviewed annually by all parties. Any intermediate changes or amendments will be coordinated with all parties involved before the changes are incorporated.

NEW FOR 2005

WFO Guam is currently in the program implementation process, including fire weather training for forecast staff, obtaining GFE formatters, completion of a Station Duty Manual (SDM) section, and spin-up of WIMS observations and point forecasts for sites in southern and northern Guam. The target date for dissemination for all fire weather products is June 1, 2005.

NWS RESPONSIBILITIES

The National Weather Service has a Weather Service Forecast Office located in Tiyan, Guam. This office will provide weather forecast products in support of fire suppression operations on the island of Guam. This will include: a standard fire weather planning forecast, to be issued once daily in the afternoon, with occasional event-driven updates if necessary; fire weather watches and red flag warnings to warn of significant weather threats, which may affect fires and require repositioning of resources. Spot forecasts, as requested by government agencies involved in fighting currently burning wildfires or soon-to-be ignited prescribed burns, will be provided as necessary.

In support of the National Fire Danger Ratings System (NFDRS), WFO Guam will disseminate a daily WIMS observation, and generated routine point forecasts for sites in southern and northern Guam.

FORESTRY RESPONSIBILITIES

The Guam division of Forestry will supply phone numbers for any crews they or other agencies place on firefighting duty on Guam. The division of Forestry will also supply observations of 1 hour fine dead fuel moisture to the National Weather Service, and keep the National Weather Service apprised of their current Fire Danger Rating. In addition, the division of Forestry will supply the NWS with fuel sticks in support of WIMS observations at WFO Guam.

FIRE SEASON

The fire season will be broken into two separate periods. The dry fire season will run from December 1 through May 31. The wet fire season will begin on June 1 and end on November 30. These dates may be changed depending on the severity of the fire season.

FIRE WEATHER WATCH/RED FLAG WARNING

Specific conditions must be met for a Fire Weather Watch and/or a Red Flag Warning to be issued. These conditions are as follows:

1. Low fuel moisture. Typically occurs during the dry season. Monthly precipitation less than 2.00 inches with a decrease and/or cessation of percolation (dew)…**and…**
2. Sustained 20 foot level winds of 18 mph (ASOS 33 foot level METAR winds of 25 mph, or 22 knots) or higher for one hour or more **and…**
3. Minimum Relative Humidity of less than 60% in one or more observations.
4. Complicating factors such as wind shifts during near-Red Flag conditions can greatly increase the chance of extreme wildland fire behavior. Forecaster judgment must be used in watch/warning decision.

If the forecast office issues a Fire Weather Watch or Red Flag Warning, the fire weather forecaster will highlight the watch or warning in the Fire Weather Planning Forecast by using a headline and will also call the affected users. Examples of the Fire Weather Watch and Red Flag Warning are available in the SDM.

A **"Fire Weather Watch"** is used to alert the user to the possible development of a Red Flag event in the near future. This could be up to 72 hours in advance.

A **"Red Flag Warning"** will be issued to warn the user of an impending or ongoing Red Flag event. A Red Flag Warning will be issued immediately when Red Flag Conditions are occurring. Otherwise, it will be issued for impending Red Flag Conditions when there is a high degree of confidence that conditions will develop and the forecast time of onset for the event is less than four hours.

Because of the restrictions on user programs brought about by a Red Flag Warning, it is imperative that the warning be promptly canceled when the conditions cease to exist or if the conditions are no longer expected to develop.

FIRE WEATHER PLANNING FORECAST

During the fire season the Fire Weather Planning Forecast will normally be issued by 300 PM Guam Local Time, seven days a week. A headline may be added to the top of the forecast, denoting significant weather, or for the issuance of a Red Flag Warning or Fire Weather Watch. The discussion will briefly cover locations of fronts and systems which produce the weather along with highlighting significant trends or changes that the forecaster anticipates. The 3 day tabular forecast will cover specific weather elements mentioned below. The narrative extended forecast portion of the forecast will pick up where the short term left off and continue out through day seven. The extended portion is a general forecast which mentions the possibility of precipitation, expected high and low temperatures for each day, and wind speeds and direction. An example of the Fire Weather Planning Forecast is available in the SDM.

Elements of the tabular and narrative sections are described below.

1. SKY COVER

A. Clear (or Sunny) -- < 1/8th cloud cover.
B. Mostly Clear/Mostly Sunny -- 1/8th to 2/8ths of cloud cover.
C. Partly Cloudy/Partly Sunny-- 3/8ths to 5/8ths of cloud cover.
D. Mostly Cloudy -- 6/8ths to 7/8ths cloud cover.
E. Cloudy -- 8/8ths cloud cover.
F. Increasing Cloudiness -- the clouds are increasing in amount (this also implies thickening of clouds).
G. Decreasing Cloudiness-- A progressive decrease in the amount of sky covered with clouds.
H. Variable Cloudiness-- A constant variation in the amount of clouds covering the sky with respect to time and space.

2. PRECIPITATION TYPE

A. Rain--General, not showery, usually in a stable atmosphere. Small to medium sized water droplets.
B. Drizzle--General precipitation in a stable atmosphere. Very small water droplets that appear to float in the atmosphere.
C. Showers--Rain/snowfall of short duration and varying intensity, usually beginning and ending abruptly.
D. Thunderstorms--Downpour of rain, often with strong gusty winds..

3. TEMPERATURE

The temperature will be in degrees Fahrenheit. The maximum and minimum temperatures are forecast for the 30-hour period from 1:00 PM the day of the forecast until 7:00 PM the next day.

4. **RELATIVE HUMIDITY**

The Relative Humidity (RH) is the ratio, in percent, of the amount of moisture in the air compared to the amount the air could hold if fully saturated (100%). The range of RH is from 0% to 100%. Usually, the minimum RH occurs at the time of the maximum temperature and the maximum RH occurs at the time of the minimum temperature. Because of the dependency of the relative humidity upon temperature, it should be noted that if the temperature is under forecast (the actual temperature is higher than forecast), then the forecasted relative humidity will likely will be too high.

5. **WIND - DIRECTION AND SPEED**

The wind direction applies to the direction from which the wind will blow. The direction will be listed using the 16 point compass (e.g. NE, S, WSW, etc.). Any significant changes expected during the forecast period will be mentioned in the narrative. The wind speed will be in miles per hour (mph). The speed is the forecast for the 20-foot level. Speeds pertain to the two minute averages while gusts pertain to the maximum instantaneous value expected.

6. WIND SHIFT

If a shift in wind direction associated with a shear-line passage is expected during the period, the new direction and wind speed will be forecast. Wind shifts may also be mentioned in the synopsis. Because a shear-line may take several hours to move through a zone, the approximate time of the wind shift will be encoded (i.e. Northeast 10 to 15 mph after midnight).

7. POPS AND TYPE

The probability of precipitation, or POP, expresses the chance that measurable rainfall will occur at any given point within a county zone group. Measurable rainfall is 0.01 inches or greater. Probability is expressed in percent. A forecast of the predominate type of precipitation will accompany a probability of precipitation forecast **(i.e. 40 percent chance of showers, 60 percent chance of rain, 100 percent chance of thunderstorms).**

8. SMOKE MANAGEMENT FORECAST PARAMETERS

The forecast parameters include mixing height, and transport wind. Note: One consequence of the Clean Air Act is that land managers must practice principles of careful smoke management. This is done by combining favorable meteorological conditions with a variety of prescribed fire techniques so that smoke will be readily dispersed. The Clean Air Act has established 500 meters (1700 feet) as a minimum for mixing height for permitting prescribed burning.

A. AFTERNOON MIXING HEIGHT

Mixing height is the extent or depth to which smoke will be dispersed by means of turbulence and diffusion. The forecast of mixing height is expressed in feet above ground level.

B. TRANSPORT WIND
Transport wind is the average wind speed in mph in the mixing depth above the surface. These winds are a good indication of the horizontal dispersion of suspended particles. The transport wind is the forecast wind at the time of maximum mixing of the atmosphere, normally during the mid afternoon. Usually a wind of less than 8 mph restricts an agency from burning. Transport wind directions are typically given to eight compass points (e.g. northeast, east southwest, etc.)

WIMS OBSERVATIONS

The Guam division of Forestry will enter into WIMS the data from the RAWS site located in southern Guam. WFO Guam will enter into WIMS the data for the ASOS site located in northern Guam. The observations should be entered into WIMS as soon as possible after 1:00 PM Local Standard Time. Point forecasts will not be prepared without the ability to look at each observation.

WIMS POINT FORECASTS

Point forecasts will be issued by 2:00 PM daily for the RAWS and ASOS sites. The National Fire Danger Rating System (NFDRS) is a quantitative means for evaluating the fire danger. This complex model of fuel and weather parameters processes daily weather observations and fuel moisture as input, and fire managers receive numeric output that suggest the severity of fire danger over a large area.

Point Forecast Terminology

1. STATION NAME
Each location will have a name. This name will be provided by the agency requesting the observation site.

2. STATION NUMBER
Before a forecast will be made for a station, it must have a valid station number in WIMS.

3. VALID DATE
The valid date will be the next day in the order: YYMMDD

4. VALID TIME
The valid time will be 1300 (1:00 PM)

5. State of the Weather
A single digit number from 0 to 9.
0 Clear (Less than 1/10th of sky is cloud covered).
1 Scattered Clouds (1/10th to 5/10ths of sky cloud covered).
2 Broken Clouds (6/10ths to 9/10ths of sky cloud covered).
3 Overcast (More than 9/10ths of sky cloud covered).
4 Foggy
5 Drizzle

6. Rain
7 Snow or Sleet
8 Showers (In sight or at station and reaching the ground).
9 Thunderstorms/Hail

6. TEMPERATURES
Temperature forecast for 1:00 PM the next day.

7. RELATIVE HUMIDITY
Relative Humidity forecast for 1:00 PM the next day.

8. LIGHTNING ACTIVITY
A. Period 1 (L1) is from 2 PM until midnight that night (a 10 hour period). Period 2 (L2) is from midnight the night of the forecast until midnight the next night (24 hour period.)
B. A single digit (1 through 6) will be used. The meaning of each number is as follows:
1 No thunderstorms
2 Few building cumulus with isolated thunderstorms
3 Building cumulus with scattered thunderstorms, light to moderate rain reaches the ground.
4 Thunderstorms common but do not obscure the sky, moderate rain reaches the ground.
5 Thunderstorms common and occasionally obscure the sky, moderate to heavy rain reaches the ground.
6 Same as 3 above but dry, no rain

9. WIND DIRECTION AND SPEED
Wind forecast at 1 PM the next day. The wind speed is a 10 minute average at 20 feet above the ground measured to 16 compass points (e.g. WSW, NW, NNE, E, etc).

10. TEN HOUR TIME LAG FUEL MOISTURE
Since the fire weather meteorologist does not typically have access to fuel moisture information, an M will be entered for missing.

11. TEMPERATURE
The 24 hour maximum and minimum temperature forecast from 1:00 PM the day of the forecast until 1:00 PM the next day. This will typically be the maximum temperature of the current day and the overnight low expected in the next 12 to 16 hours.
The temperature in the maximum temperature column must be at least equal to or higher than the temperature given in part (6) above. If not, WIMS will not process a forecast for that station.

12. RELATIVE HUMIDITY
The 24 hour maximum and minimum Relative Humidity forecast from 1:00 PM the day of the forecast until 1:00 PM the next day. The maximum RH value listed must equal or exceed the value given in part (7.) above. Similarly, the minimum RH value must equal

or be less than the value in part (7) above. Either error will cause WIMS to not process a forecast for that station.

13. PRECIPITATION DURATION
The number of hours for which precipitation is forecast. Period 1 is from 1:00 PM the day of the forecast until 5:00 AM the next day (16 hours). Period 2 runs from 5:00 AM the next day until 1:00 PM that same day (8 hours).

14. WET FLAG
Wet flag is used to indicate "fuels wet". All indices will be forced to zero if Y=yes is used. NOTE: in most cases an N=no will be used unless there is snow on the ground or the ground is extremely wet. If the duration of precipitation is 3 hours or greater between 500 am to 100 pm of the next day, the Wet Flag should be tripped to a Y value. Also if rain or snow is expected to be occurring at 1300, the Wet Flag should be tripped to a Y value.

SPOT FORECASTS

Requests for Spot or Prescribed Burn forecasts will be made via telephone. Unless otherwise stated by the requesting agency, the forecast parameters of sky condition, weather, temperature, relative humidity, 20 foot wind, significant/sudden changes in wind speed or direction, along with mixing heights, and transport winds shall be provided.

METHODS OF COMMUNICATIONS

REGULAR FORECASTS
The Fire Weather Planning Forecast may be found on the INTERNET at the addresses listed earlier. NFDRS data may be found on the WIMS internet site, given a proper user ID and password.

VERIFICATION OF RED FLAG FORECASTS

Verification of Red Flag Warnings and Fire Weather Watch Forecasts will be conducted during the 2005 fire season. **Methodology of Verification for Red Flag Warnings and Fire Weather Watches:**

Verification of Red Flag Warnings and Fire Weather Watches will be “tracked” for each fire weather zone. A Red Flag Warning issued at the request of a land management agency will NOT be considered for verification purposes. However, such warnings issued will be tallied separately and, for the purpose of workload indication, will be included in the number of total warnings issued for that office.

Data/information from surface observations (ASOS, RAWS, AWOS, etc.), supplementary and complementary weather sources, satellite and radar imagery, etc. may be used to verify (or to not verify) Red Flag Warnings and Fire Weather Watches. Experience, judgment, objectivity, consistency, and ethics will be used in verifying.

NOAA WEATHER RADIO

Fire Weather Watches and Red Flag Warnings are not typically broadcast on NOAA Weather Radio.